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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,126	09/19/2001	Keum Joo Lee	259/011	8415

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EXAMINER
KORNAKOV, MICHAIL

ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/955,126	LEE ET AL.	
	Examiner	Art Unit	
	Michael Kornakov	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following: Page 4, paragraph 0020 of the instant disclosure recites "The priority Korean Patent Application No. 00-xxxxx, filed xxxxx, 2000, is hereby incorporated in its entirety by reference". Since no information on the Korean Application is provided, such priority has not been granted.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukazawa et al (U.S. 5,868,855).

Fukazawa teaches a method of cleaning a silicon wafer, having silicon oxide film formed thereon. The method of Fukazawa comprises the steps of introducing the silicon wafer into the processing bath and supplying to the said processing bath HF and ozone water, thus mixing and forming a processing solution of HF and ozone water, maintaining the silicon wafer in the processing solution for 3 minutes, thus cleaning the silicon wafer and after this introducing ozone water into the processing bath to replace the processing solution of HF and ozone water. Ozone water is continuously supplied to overflow for approximately 10 minutes (paragraph, bridging col.4 and 5; col.5, lines 12-22; Fig.2, steps 2 through 4). The HF concentration in the processing solution is in the range of 0.01% to 1% and the concentration of ozone water is in the range of 0.1 ppm to 20 ppm. The end point concentration of ozone water (20 ppm) in the range of Fukazawa is a specific data point within the instantly claimed range and therefore the instantly claimed concentration of ozone water is anticipated by Fukazawa.

The teaching of Fukazawa differs from the instant claims by introducing the silicon wafer into the processing bath prior to supplying to the said processing bath HF

and ozone water. However, **selection of any order of performing steps is prima facie obvious in the absence of a new and unexpected results**, consult ***In re*** Burnhans, 154F.2d690, 69 USPQ 330 (CCPA 1946) and ***Ex parte*** Rubin, 128 USPQ 440 (Bd.App.1959).

Therefore, one skilled in the art at the time the invention was made would have found it obvious to utilize any order of performing steps in the teaching of Fukazawa with the reasonable expectation of success.

Regarding the specific limitation of claims 6 and13, which is concerned with 15 minutes period of exposure of semiconductor to processing solution, it is noticed here that such period of exposure is result effective parameter, which depends on level and nature of contaminants, desired roughness of the cleaned surface, etc.

Regarding the specific limitation of claim 16, which is concerned with 20 minutes period of flowing ozone water into the vessel to cause the overflow of solution of HF and ozone water out of the vessel, it is noticed here that such flowing period is a result effective parameter, because it regulates the substitution of processing solvent with ozone water depending on the size of the processing vessel, flow rate of ozone water, etc. However, discovery of optimum value of result effective variable in known process is ordinarily within the skill in the art and would have been obvious, consult ***In re*** Boesch and Slaney 205 USPQ 215 (CCPA 1980).

While teaching a method of cleaning a semiconductor structure with the steps, similar to the instantly claimed and providing for the removal of silicon oxide layer, Fukazawa does not specifically indicate removal of damaged layers and polymer

residue, as recited in the instant claims 7 and 17. However, it is axiomatic that one who performs the steps of the known process must necessarily produce all of its advantages. Mere recitation of a newly discovered function or property, that is inherently possessed by things in the prior art **does not cause a claim** drawn to these things to distinguish over the prior art, consult Leinoff v. Louis Milona & Sons, Inc. 220 USPQ 845 (CAFC 1984).

6. Claims 18-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukazawa et al (U.S. 5,868,855) in view of JP07-037851.

While forming the processing solution by mixing the same ingredients as instantly claimed, the teaching of Fukazawa does not specifically indicate forming "a uniform solution of HF and ozone water", as indicated in the instant claims 18 and 29. However, it is conventional in the art to produce and utilize a uniform processing solutions for treatment of semiconductor surfaces, as provided, for example, by JP 07-037851.

JP'851 teaches, that it is conventional to treat semiconductor devices with HF containing processing solution, which is uniformly mixed, in order to provide a uniform treatment of semiconductor surfaces, JP'851 also discloses the circulation of such processing solution by its flowing from an inner portion of the processing tub to an outer portion of the tub and pumping back, utilizing a pump (paragraph 0003, Fig 2).

Because Fukazawa is concerned with cleaning of semiconductor surfaces utilizing HF containing processing solution and JP'851 emphasizes the importance of providing a uniform mixing of such solutions, one skilled in the art motivated by the

teaching of JP'851 would have found it obvious to apply a uniformly mixed processing solution, prepared by conventional technique of JP'851, in order to provide an even treatment of semiconductor surfaces in the method of Fukuzawa and, thus, to arrive at the limitations as instantly claimed.

Claims 24, 28, 35, 38 and 42 are rejected over the combined teaching of Fukazawa and JP'851, applying the same rationale as for the rejection of claims 6, 7, 13, 16 and 17 respectively.

7. Applicant should note that additional prior art cited in PTOL-892 shows general state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (703) 305-0400. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 2450.

M. KORNAKOV

Michael Kornakov
Examiner
Art Unit 1746